

**NATIONAL
WILD FISH SURVEY**

**California-Nevada
Fish Health Center**

**PROGRESS REPORT
August 10, 1998**

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Prepared by Kimberly True

CALIFORNIA-NEVADA FISH HEALTH CENTER (Ca-Nv FHC) STAFF

Center staff participating in Wild Fish Survey (WFS) by establishing protocols and procedures, assisting with sample collections, performing laboratory assays, and entering results in the WFS database.

Scott Foott
Kimberly True
Ken Nichols
Rick Harmon
Jimmy Faulkner
Beth McCasland

TECHNICAL SUPPORT PROVIDED

The Ca-Nv Fish Health Center provided technical support to the Wild Fish Survey by developing and distributing standardized tissue for the Enzyme-linked Immunosorbent Assay (ELISA). Kimberly True collected kidney tissue from 51 adult fall chinook salmon and after testing to screen out positive samples, distributed this tissue to Fish Health Centers to use as a negative control. Dorothy Chase of the Western Fisheries Research Center, in Seattle, also provided additional testing by Polymerase Chain Reaction, the most sensitive detection method for this pathogen. This work allowed standardization of the ELISA among all nine fish health centers so that consistent, nationally comparable data for the prevalence and distribution of *Renibacterium salmoninarum*, a serious fish pathogen, could be determined in wild fish populations.

The Center also made significant contributions to the development of a Wild Fish Survey Manual that includes standardized procedures and comprehensive protocols to test wild fish for major fish pathogens. Specifically, we wrote WFS protocols for detection of *Renibacterium salmoninarum* by ELISA, and *Myxobolus cerebralis* by Polymerase Chain Reaction. These protocols represent assays developed by Dr. Karl Andree, UC-Davis and Ron Pascho of Western Fisheries Research Center in Seattle. Standardization of these protocols into written procedures for the WFS has allowed Fish Health Centers to collect,

process and test fish tissues in a consistent manner throughout the country and also optimizes the sensitivity of these important assays.

WILD FISH SURVEY SAMPLING SITES

Battle Creek

Battle Creek is a watershed in northern California which originates from the volcanic geology of Mount Lassen, and flows through pristine stretches such as Eagle Creek Canyon towards the Sacramento River. Battle Creek is a healthy ecosystem comprised of undisturbed habitat and cool water for natural salmon production. Substantial potential exists in this watershed for restoration of endangered and threatened salmon stocks in Northern California; this includes steelhead, as well as Sacramento Winter-run, Spring, Fall, and Late-fall chinook. This watershed is also the source of water for Coleman National Fish Hatchery (CNFH) which produces over 25 million fish annually and is the largest federal hatchery in the United States. Due to the number of fish and complexity of this hatchery program, disease prevention of hatchery stocks and protection of this water supply are important components of the Center's fish health management responsibilities. Battle Creek is also proposed for large-scale restoration activities to support natural production of California's endangered Spring Chinook as well as Sacramento Fall Chinook and Late-Fall salmon.

The Center developed a study plan to survey fish pathogens in both anadromous and non-anadromous waters in Battle Creek.

In addition to sampling wild fish for disease, the survey provides information to fisheries managers about fish pathogens in this important water supply for Coleman hatchery, and baseline data that can aid future restoration activities.



A total of 226 fish, representing 5 species were collected and tested for fish diseases between April and August 1999. Moderate levels of *Renibacterium salmoninarum* were found in the sacramento suckers and pike minnows collected for the Survey when tested by ELISA. These findings are pending confirmation by PCR.

Myxobolus cerebralis spores were found in rainbow trout from the North Fork of Battle Creek. The spores were recovered from cranial elements treated with the Pepsin/Trypsin digest method. These spores were confirmed to be *Myxobolus cerebralis* by PCR. Battle Creek is a known Whirling Disease infected watershed. In 1986, 1.2 million juvenile steelhead raised at Coleman National Fish Hatchery were destroyed after testing positive for whirling disease. Whirling disease has not been detected in any Coleman stocks in subsequent years. The disease was also found in the South Fork of Battle Creek by the California Department of Fish and Game and at several private hatcheries in the Battle Creek drainage during the 1980's.

Endangered Winter-run chinook, Sacramento River, California

Sacramento winter-run chinook, a federally and state listed species in California, were sampled for disease pathogens as adults returned to the upper Sacramento River. Adult fish were captured at Keswick Dam and sampled for fish pathogens as gametes were collected for the propagation program at the Livingston Stone NFH. Determination of disease status, especially the incidence of Bacterial Kidney Disease (BKD) caused by *Renibacterium salmoninarum*, is an important fish health management concern for this important restoration program.

East Fork of the Walker River, NV

Twenty rainbow trout and thirty brown trout from the East Walker River were tested for *Renibacterium salmoninarum* and *Myxobolus cerebralis*, the fish pathogens causing Bacterial Kidney Disease (BKD) and Whirling Disease. No reportable fish pathogens were found.

Quinn River Drainage, Nevada

In cooperation with the Nevada Division of Wildlife, 57 wild Lahontan Cutthroat Trout were sampled from 3 tributaries (Threemile, Crowley, and Washburn Creeks) by means of electrofishing. Pathogens testing detected *Renibacterium salmoninarum* at moderate levels in this wild fish population. PCR confirmation of these samples for the *Renibacterium salmoninarum* antigen are still pending. Viral samples were negative. Whirling disease (*Myxobolus cerebralis*) testing was also conducted to determine current status of this pathogen in the geographical area, which historically has been endemic for this parasite. Cranial elements from the 57 fish were treated with the Pepsin/Trypsin digest method and examined by microscope. Observation of these samples yielded no sightings of *Myxobolus cerebralis*.

Tracy Fish Collection Facility, CA

The Bureau of Reclamation, Tracy Fish Collection Facility is located on the San Joaquin River in the Sacramento- San Joaquin delta region of the state. Several Bureau of

Reclamation employees graciously collected non-salmonid species for the Fish Health Center to sample. A total of 268 fish (majority catfish) were tested for the Wild Fish Survey. *Renibacterium salmoninarum* antigen was detected by ELISA in several of these species, however, PCR testing will be performed before a positive status is confirmed. No other reportable fish pathogens were found in the collections.

Mason Valley Wildlife Management Area, Nevada

Fish were collected in cooperation with the Reno FWS Office- Division of Contaminants and Nevada Division of Wildlife. Wetlands within the management area yielded 39 common carp and 21 largemouth bass by electrofishing and beach seining. The samples are being used to provide information on the quality of water sources in the Walker Lake watershed. Pathogen testing resulted in no reportable bacteria for the WFS database. Virology was negative and testing for the *Renibacterium salmoninarum* antigens by ELISA is pending. Histological sample results are pending. In addition to microbial samples, a variety of blood and tissue samples were collected for evaluation of physiological condition.

Salton Sea, CA

In response to the massive fish kills and their link to botulism deaths in Salton Sea waterfowl, the FHC cooperated with the Sonny Bono NWR and USGS in an unfunded project to examine the health of the Sea's tilapia on a seasonal basis. Tilapia were captured by gill net near the mouth of the Alamo River, a prime rookery area, and sampled for morphometric data, bacteria, and histological specimens. Collections have occurred in January and May 1999. In addition, samples from moribund fish collected in the region have also been submitted to the FHC for analysis. A large number of *Vibrio* and *Aeromonas* species have been isolated from apparently healthy fish (Jan = 54 %, May = %). We are concerned about the high potential for external contamination from this eutrophic site. Histological examination revealed no significant parasitic infections or lesions, however, lipopigment deposits (lipofuscin and ceroid) were common. The severity of the lipopigment content was much lower than that observed in fish collected during extreme water quality periods and may serve as a bioindicator of such stress.

Lake Mead, NV

The FHC was a cooperator in a USGS study on endocrine disrupter effects on carp from the Las Vegas Wash. Our role is to provide training in necropsy and sample collection, laboratory analysis of bacterial cultures, leukocyte counts from blood smears, and

histological analysis of liver and kidney. Fish have been collected by electrofishing in May, June, July, and September 1999. No significant bacterial or parasitic infection have been detected in either the contaminant or control site populations. No consistent trend in elevated neutrophil counts or endogenous pigment depositions has been determined from the May and June collections. The presence of iron granules in the hepatocytes without any signs of hemolytic distress may indicate a dietary or waterborne source.

(Numbers correspond to List of Partners, page 8)



COST ACCOUNTING

CAPITOL OUTLAY **\$ 410.00**

- Capitol equipment costs.

DIAGNOSTIC TESTS **58,659.00**

- Supplies and Labor for laboratory work

Pathogen Testing 633 @ \$35.00 = 22,155.00
Histological exam 676 @ \$54.00 = 36,504.00
Total = 58,659.00

TECHNICAL ASSISTANCE **5,909.00**

- Labor for providing technical advise and support to cooperators;
WFS conferences, meetings and stakeholder outreach.

ELISA Negative Control Tissue 2011.00
Protocol Development (2) 2011.00
Whirling Disease Conference 498.00
Meetings and Outreach 1389.00
Total = 5909.00

FIELD SAMPLING COSTS **10,158.00**

- Labor and supplies outside laboratory costs.

DATA VERIFICATION / DATA ENTRY COSTS **5,487.00**

- Data checking and input into WFS database.

Data verification 2011.00
Data entry 3476.00
Total = 5487.00

TRAVEL **651.00**

- Airfare or other common carrier expenses

TOTAL = \$ 81,274.00

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